8. Angle MV7 .... 64 48+7 12=72 0
9. Angle MV8 .... 72 0+7 12=79 12
10. Angle MV9 .... 79 12+7 12=86 24
11. Angle MVR.... 86 24+3 36=90 0

Now, with these angles taken in order, and the constant obliquity 45°, we calculate the inclination of the face of each quoin to its bed or coursing joint, and the rule by which the calculations are made, is given on page 460 of this volume of the *Builder*; but to avoid the trouble of reference, we think proper here to repeat it. The rule is as follows:—

RULE.—*To the logarithmic tangent of the constant obliquity, add the logarithmic cosecant of that portion of the quadrant for which the angle of bevel is wanted, and the sum, less* 10 *in the index, will be the logarithmic tangent of the required angle of bevel.*

Now, beginning at the first course on the left of the figure, the angle between the springing joint and the face of the first quoin is 69° 47', and the mode of calculating it is as follows:—

Given obliquity	45° 0′	..... log. tan.	10·000000
Given angle AVM	21° 36′	.. .. log. cosec.	10·458306
Required angle of bevel PAM	69° 47′	log. tan.	10·458306

The angle here computed is the inclination between the face of the first quoin and the springing joint; but the inclination between the bed of the quoin and the face of the abutment on which it rests, is the supplement of the angle just found, or 110° 13'.

Again, the bevel or angle between the face of the first quoin or arch-stone, and the bed of the second, is found as follows:—

Given obliquity	45° 0	..... log. tan	10·000000
Given angle MV1	28° 48	..... log. cosec.	10·317178
Required angle of bevel PAM	64° 17′	log. tan.	10·317178

But the angle between the face of the second quoin and its bed, is the supplement of the angle just computed, viz. 90°—64° 17′ = 115° 43', and in precisely the same way are the bevels for the other quoins computed, and the bevels for the whole arch will therefore, stand as in the following tablet:—

Table of Bevels at the several Coursing Joints.

No.	Central Angles.	Face Bevels.	Supplements.
	° ′	° ′	° ′
1	AVM = 21 36	69 47	110 13
2	MV 1 = 28 48	64 17	115 43
3	MV 2 = 36 0	59 23	120 27
4	MV 3 = 43 12	55 36	124 24
5	MV 4 = 50 24	52 23	127 37
6	MV 5 = 57 36	49 49	130 11
7	MV 6 = 64 48	47 52	132 8
8	MV 7 = 72 0	46 26	133 34
9	MV 8 = 79 12	45 31	134 29
10	MV 9 = 86 24	45 3	134 57

Now, it is manifest that the several moulds constructed from these angles will answer also for the courses in the other semi-arch, beginning at the abutment BW, on the reverse side of the arch from that at which the above series begins: in fact, the same set of moulds answers for both semi-arches by applying them in a contrary order.

It would be superfluous to show the mode of constructing the moulds for each of the courses, as the principle is the same in all when the several angles of bevel are known: it will therefore suffice to construct one mould, as all the others are constructed in a similar manner, and for this purpose we shall make choice of that numbered 4 in the diagram, which corresponds to No. 5 in the above table, for which the angles are 52° 23' and 127° 37' respectively.

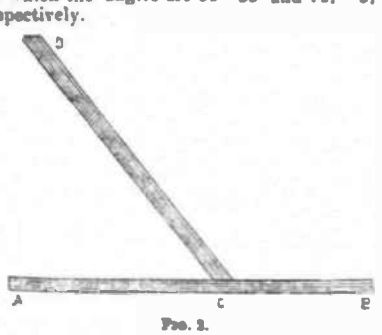

FIG. 2.

Draw the straight line AB, fig. 2, which will apply to the faces of the two quoins contiguous to the joint numbered 4 in the diagram fig. 1, or to the face of the arch generally; then, in AB take any point C, and make the angle ACD equal to 52° 23', or equal to the angle P/M in the diagram; then will the straight line CD lie in the direction of the joint or bed between the two contiguous quoins; and in the same way may the moulds be constructed for any other quoin in the arch, which moulds being duly applied to the stones, will enable the workmen to give them the proper bevel.

We have next to determine the form of the beds, or the inclination of the joints in the face of the arch, to the corresponding joints along the soffit, and, for that purpose, we repeat the rule given at page 460 in a preceding number of the *Builder*.

RULE.—*Add together the logarithmic cosine of the constant obliquity, and the logarithmic cosines of the several central angles, and the sums less* 10 *in the index will be the logarithmic cosines of the required inclinations.*

Therefore, by taking the central angles as given in the preceding table, and applying the above rule, the several inclinations will be as tabulated below:—

Table of Inclinations of the several Face and Soffit Joints.

No	Central Angles	Inclinations.	Supplements.
	° ′	° ′	° ′
1	AVM = 21 36	48 54	131 6
2	MV 1 = 28 48	51 43	128 17
3	MV 2 = 36 0	55 6	124 54
4	MV 3 = 43 12	58 58	121 2
5	MV 4 = 50 24	63 12	116 48
6	MV 5 = 57 36	67 44	112 16
7	MV 6 = 64 48	72 29	107 31
8	MV 7 = 72 0	77 23	102 37
9	MV 8 = 79 12	82 23	97 37
10	MV 9 = 86 24	87 27	92 33

It will here be seen, that as the central angle increases, the inclinations between the face and soffit joints decrease for the first semi-arch, and increase for the second, and form a right angle at the crown. The following is the mode of constructing the mould:—

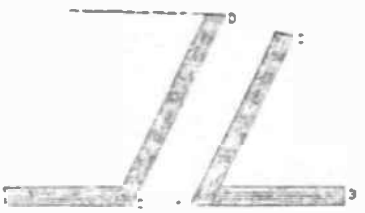

FIG. 3.

Draw the straight lines AC and CB, fig. 3, to represent the joint in the face of the arch, and at any point C therein, make the angles ACD and BCD, equal to 116° 48' and 63° 12' respectively; then will CD be the corresponding joint along the soffit, at the fourth joint from the springing in the first semi-arch; and at the same joint in the second semi-arch, CB will represent the joint in the face, and CD the joint along the soffit, and this is only the mould ACDE reversed; for the beds of the courses in the opposite semi-arches reverse each other in form, so the same mould that answers for any particular joint in one semi-arch, will by reversion, equally answer for the corresponding joint in the other semi-arch. And in this way may the arch stones be formed for an oblique arch of any size whatever.

THE VALUE OF DRINK IN MANCHESTER.—It has been shown, says the Leeds *Mercury*, that in the 2,074 public-houses and beer-houses of Manchester and Salford, 4,074*l.* is spent every Saturday night in liquor, which would amount to 211,848*l.* a-year. That is, SEVEN TIMES *as much as was lately estimated to be necessary to educate all the children in Manchester.* Wicked and horrible waste! Waste! Nay, rather the purchase-money of degradation and misery. So dear do men buy their own ruin.

THE WELLINGTON CAR.

WE looked quietly the other day at the car prepared for the funeral of the Duke of Wellington, as it reposes, shorn of its symbols, beneath a shed in the yard of Marlborough-house, and take the liberty of saying that it ought not to be sent to Chelsea Hospital for exhibition without considerable alteration. It was got up in an incredibly short space of time, and there are many points about it which entitle the parties concerned in it to great commendation. Those, however, who examine a formation in bronze look for a perfect work: the material does not consort with haste and a temporary purpose, and the body of the car is so bad, both in modelling and execution, that we hope the Department of Practical Art will set some of the students to work to chase it all up, and set it right, certain radical defects having been first corrected, the leading lines made parallel and square, and the wheels centred and brought forward. Mr. Robinson, by whom the parts in question were executed, has turned out some good castings, so that we wonder the more he should have allowed such work to go out of his hands. Messrs. Tylor have been much more successful with the wheels, and deserve great praise for the manner in which these are executed. The bronze facings are put upon strong wooden wheels, 5 inches thick, with eight spokes each. Each wheel is 4 ft. 2 in. in diameter, and 6 ft. from centre to centre. The full dimensions of the car are, length 20 ft. 4 ins.; width, 10 ft; and height, 6 ft. 4 ins. The axles are about 4 ins. square. The mode of connecting the wheels and locking them,—indeed, the whole arrangement of the carriage as a machine, reflects great credit on Messrs. Barker and Co. who had but a few days for the invention. The figures at the angles, modelled by Mr. Whittaker, a young student in the school, in eight days, ought to secure his advancement.

SLAUGHTERING IN THE METROPOLIS.

IN bye-places, the resort of the working population, where streets are narrow, ill-ventilated, and most probably worse drained, the hideous orgies of slaughter have long been carried on, without any inquiry whether the residents were incommoded by the driving of flocks and herds through narrow lanes, or even whether, in a sanitary point of view, the "*salus populi*" were endangered by the custom. Still, with respect to these localities, but little improvement has been effected through the mediation of sanitary boards: the markets and their approaches are as filthy, the kennels as full, and the particular yards of operation as feculent as ever!

Those who pass by most of course see the obvious neglect of propriety, such as regular scavenging and sweeping, and not being conversant in the neighbourhood, may remark, as a Frenchman did, "*Oh, c'est mal soigné.*" He takes it for granted, and, in fact, as a necessity, that the causeways of the poor *cannot be clean*; but there never was a greater mistake: if Portland-place, 100 feet wide, can be regularly swept, why not alleys of 16 feet? Although the mechanical sweeping-carts were never intended for lanes in Bermondsey or Clerkenwell, they would be admirably adapted to the expurgation of closes. But few, however, take the trouble to inspect the recesses of swarming poverty: the outer approaches are repulsive enough, but the *cul de sacs*, the *penetralia*, are absolutely intolerable for stench and all sorts of abominations.

Cosmopolitan principles have happily turned public attention to the sanitary question, and the alarm for spreading contagion has slipped in to the aid of more humane motives; therefore all that concerns health amongst the masses is only secondary to a due regard towards the easements, such as sewage, water supply, and ventilation of the more fashionable quarters; for, as in cases of infections by a scratch in the extremest joint of the human system, so the virus of contagion, when once implanted in the remotest quarter will permeate a whole population.

It was shown in a recent number of the

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